

**REMARKS**

In Amendment C filed October 9, 2006 in response to the Office action mailed July 19, 2006, applicants inadvertently failed to include original claim 9 in the listing of claims.

Applicants were advised of this deficiency in the Office action mailed December 26, 2006.

In the Office communication dated February 14, 2007, applicants were advised that the Office action mailed December 26, 2006 had been vacated and claims 10-14 had been renumbered as claims 9-13 under 37 CFR 1.126.

Accordingly, original claim 9 has been reintroduced into this application as new claim 14 such that claims 1-14 are pending in the application.

**Telephone Interview**

The undersigned attorney thanks the Examiner for the courteous telephone interview conducted on June 14, 2007 and the Interview Summary prepared by the Examiner and mailed June 21, 2007.

**Rejection under 35 U.S.C. 103(a)**

Applicants request reconsideration and withdrawal of the rejection of claims 1-13 under 35 U.S.C. §103(a) as obvious over EP 0 151 886 ("EP '886") with or without JP 5186392 ("JP '392").

Applicants have previously discussed and characterized the invention as defined in independent claim 1 and the disclosure in EP '886 and JP '392 in their responses filed October 9, 2006 (Amendment C) and November 16, 2004 (Amendment B).

On page 2 of the Office action, the Office contends that the requirement of step (d) in independent claim 1 of recovering a first distillate comprising ethyl acetate, ethanol, and not

more than about 10 mol% water from the first distillation zone is directed more to a "result" rather than to the manipulative method or process steps(s) that achieve the result. Applicants submit that the recovery of a first distillate containing no more than about 10 mol% water from the first distillation zone is not a "result" of the claimed process, but rather is an affirmative restriction that in part defines the manner in which the pressure swing distillation process is carried out. Applicants have found that effective purification of ethyl acetate from a feedstock comprising ethyl acetate, ethanol and water requires that no more than about 10 mol% water be present in the first distillate recovered from the first distillation zone in order to overcome the difficulties resulting from the binary azeotrope formed between water and ethyl acetate and the ternary azeotrope formed between ethyl acetate, ethanol and water and achieve satisfactory separation of purified ethyl acetate. That is, the about 10 mol% water limitation is a restriction that must be observed in the practice of the pressure swing distillation system to satisfactorily achieve the goal of the invention (i.e., purification of ethyl acetate from a feedstock comprising ethyl acetate, ethanol and water) and is not itself the result to be achieved.

The Office contends that applicants admitted in their response (Amendment C) filed October 9, 2006 that the about 10 mol% water requirement is a "result" of the invention when they stated that "[t]he ability of the present invention . . . to produce a product stream from the first distillation that contains not more than about 10 mol% water is a surprising result." More accurately, the present invention should be characterized in that by requiring the recovery of a first distillate from the first distillation zone containing no more

than about 10 mol% water, the pressure swing process can surprisingly be manipulated to enable purification of ethyl acetate from a feedstock comprising ethyl acetate, ethanol and water. Applicants apologize for their previous characterization of the invention to the extent that it did not accurately reflect the inventiveness of the process defined in independent claim 1.

Further, applicants are not required to delineate further the process steps as already specified in claim 1 that would result in the recovery of a first distillate containing less than about 10 mol% water. As would be understood by one of ordinary skill in the art, there are a myriad of possible process factors and conditions that impact the recovery of a first distillate containing no more than about 10 mol% water from the first distillation zone. Nevertheless, design and operation of a pressure swing distillation system capable of recovering a first distillate containing no more than about 10 mol% water from the first distillation zone is fully within the skill of those skilled in the art upon reading applicants' disclosure depending on a variety of system factors and conditions including, for example, the composition of the feedstock, the design of the distillation column or columns forming the respective distillation zone (in particular, upon the number of theoretical stages in the column), upon the heat supplied for reboiling purposes, and upon the operating pressures. See, for example, page 9, line 28 to page 11, line 4 of the application.

Applicants again submit that claims 1-14 are not obvious over EP '886 with or without resort to JP '392. The Office asserts on page 3 of the Office action that EP '866 discloses the argued recovery scheme including a plurality of distillation

stages. Applicants agree with the Office that pressure swing distillation is a technique known in the art to sometimes break azeotropes. See, for example, page 1, lines 30-32 of the application. However, the combined teachings of EP '886 and JP '392 fail to teach or suggest a pressure swing distillation system for recovering purified ethyl acetate from a feedstock comprising ethyl acetate, ethanol and water operated such that no more than 10 mol% water is present in the in the first distillate recovered from the first distillation zone.

The portion of the specification of EP '886 that describes the pressure swing distillation process (See pages 10-11 of EP '886, in particular the paragraph spanning pages 10-11) makes no reference to the presence of water. If it were contemplated that the feed stream to the pressure swing distillation system of EP '886 contained any amount of water, it would be expected that the reference would certainly refer to the presence of water, since water causes particular difficulty in such a process by forming a binary azeotrope with ethyl acetate having a boiling point close to that of ethyl acetate and a ternary azeotrope with ethyl acetate and ethanol that also has a boiling point close to that of ethyl acetate. Accordingly, by the absence of any reference to water in the disclosure of the pressure swing distillation process described in EP '886, the skilled artisan would understand that the system is not intended for water-containing feedstocks.

Furthermore, even if water were present in the feed stream to the pressure swing distillation system of EP '886 (which applicants do not concede), there is no teaching to design a system in which the first distillate recovered from the first distillation zone comprising ethyl acetate and ethanol contains no more than about 10 mol% water as called for in claim 1.

Rather, the prior art, including the disclosure of EP '886, teaches away from a system in which the first distillate contains no more than 10 mol% water and instead suggests to the skilled artisan to design a system in which the composition of the first distillate is close to the composition of the ternary azeotrope. As taught by the applicants:

Although it might be expected that it would be beneficial to design the first distillation zone so that the first distillate has a composition which is close to or at the composition of the ternary azeotrope at the operating pressure of the first distillation zone, this surprisingly proves not to be the case. Instead it is better to design the first distillation zone such that the first distillate has a composition which has as low a water content as is practicable.

See page 10, lines 10-19 of the application.

Moreover, applicants submit that the requirement in claim 1 that the first distillate recovered from the first distillation zone contain no more than about 10 mol% water is not an obvious optimization of a process parameter as the Office contends. In order to be subject to optimization, a particular process parameter must be first be recognized by the prior art as a variable that achieves a recognized result. See MPEP §2144.05(II) (B). The Office has not presented any evidence that a skilled artisan recognizes that variation of the water content in the first distillate recovered from the first distillation zone is a result-effective variable, much less that the art recognizes that by maintaining the water content of the first distillate below a certain maximum, the pressure swing system may advantageously be practiced in a manner that provides for recovery of purified ethyl acetate from a feedstock comprising ethyl acetate, ethanol and water. The mere fact that JP '392

discloses the concept of recovering ethyl acetate from a feedstock comprising ethyl acetate, ethanol and water by an entirely different process from that claimed by applicants, does not suggest that to one of ordinary skill in the art that there exists an optimum water content for the first distillate recovered from the first distillation zone of a pressure swing system.

In view of the above, applicants respectfully request withdrawal of the rejection under 35 U.S.C. §103(a) and allowance of claims 1-14.

The Commissioner is hereby authorized to charge the three-month extension of time fee in the amount of \$1020.00 and the fee related to the filing of the accompanying Request for Continued Examination in the amount of \$790.00 to Deposit Account No. 19-1345. The Commissioner is authorized to charge any fee deficiency or overpayment in connection with this amendment to Deposit Account No. 19-1345.

Respectfully submitted,

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